Estd. 1861

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BOYS' HIGH SCHOOL AND COLLEGE
SECOND TERM EXAMINATION (2024-25)
CLASS – IX
ROBOTICS

Time: 2:00 hrs

General Instructions:

- Answers to this Paper must he written on the paper provided separately.
- The time given at the head of this Paper is the time allowed for writing the answers.
- This Paper is divided into two Sections.
- Attempt **all** questions from Section A and any **four** questions from Section B.
- The intended marks for questions or parts of questions are given in brackets **[]**.

SECTION – A [40 Marks]

(Attempt **ALL** Questions)

Question 1: Multiple Choice Questions **[20X1 Marks]**

A). What will be the output of the following code snippet?

```
print(2**3 + (5 + 6)**(1 + 1))
```

a) 129
b) 8
c) 121
d) All of the mentioned

B) What are the values of the following Python expressions?

```
2**(3**2)
(2**3)**2
2**3**2
```

a) 512, 64, 512
b) 512, 512, 512
c) 64, 512, 64
d) 64, 64, 64

C) Suppose the output of an XNOR gate is 1. Which of the given input combination is correct?

a) A = 0, B' = 1
b) A = 1, B = 0
c) A = 0, B = 1
d) A = 0, B = 0

D) Which of the following is not a logic gate?

a) AND b) OR c) IF d) NOT

E) What will be the output of the following Python code?

```
for i in range(2.0):
    print(i)
```

a) 0.0 1.0 b) 0 1 c) error d) none of the mentioned

F) Convert the decimal number 45 into base 5 and base 4.

a)1150 and 2110 b) 1050 and 2101 c) 1030 and 2201 d) 1040 and 2101

G) What are the main components of robots?

a) Control system b) Sensors c) Both a and b d) None of the above

H) Which of the following precedence order is correct in Python?

a) Parentheses, Exponential, Multiplication, Division, Addition, Subtraction
b) Multiplication, Division, Addition, Subtraction, Parentheses, Exponential
c) Division, Multiplication, Addition, Subtraction, Parentheses, Exponential
d) Exponential, Parentheses, Multiplication, Division, Addition, Subtraction

I) What will be the output of the following Python code?

```
x = 'abcd'
for i in range(len(x)):
    print(i)
```

a) 1 2 3 4 b) a b c d c)0 1 2 3 d) error.

J) What is the use of proximity sensor?

a) It's used for sensing humidity
b) It's used for sensing heat
c) It's used for measuring distance
d) It's used for sensing the presence of nearby objects.

K) The main function of Actuator is _____
a) To produce motion
b) Detect input
c) Detect output
d) Detect the state of the system

L) The basic components of robot are:
a) The mechanical linkage
b) Sensors and controllers
c) User interface and power conversion unit
d) All of the mentioned

M) How can a robot with a gripper interact with its environment?
a) By moving around freely
b) By picking up and manipulating objects
c) By communicating with humans
d) By sensing its surroundings

N) Which of the following is a short-range sensor.
a) Ultrasonic Sensor
b) Radar
c) GPS
d) Camera Systems

O) Which of the following is the hexadecimal equivalent of the decimal number 255?
a) FF b) F0 c) FE d) E0

P) What is the value of the hexadecimal number 1F?
a) 15 b) 30 c) 31 d) 25

Q) What is the hexadecimal equivalent of the binary number 101110?
a) 3E b) 2E c) 1F d) 4F

R) What will be the output of the following Python code?

```
i = 0
while i < 3:
   print(i)
   i += 1
else:
   print(0)
```

a) 0 1 2 3 0 b) 0 1 2 0 c) 0 1 2 d) error

S) What will be the output of the following Python code?

```
for i in range(0):
   print(i)
```

a) 0 b) error c) no output d) none of the mentioned

T) What will be the output of the following Python code?

```
for i in range(int(2.0)):
    print(i)
```

a) 0.0 1.0 b) 0 1 c) error d) none of the mentioned

Question 2: Short Answer Questions **[10X2 Marks]**

A. State main components of a robot.
B. Explain any 4 different robot sensors.
C. Explain type of robot grippers with suitable diagram.
D. Give 4 differences between Robots and Machines.
E. Explain Industrial robots.
F. What is Universal Gates. Expalin any.(truth table ,logic diagram).
G. What is the purpose of the break statement in python.
H. What is the purpose of the Continue statement in python.
I. Wapp to find Leap Year using Nested -if Statements.
J. Explain process of converting hexadecimal to octal with example.

SECTION - B [60 Marks]
(Attempt ANY FOUR out of SIX Questions)

3A. Draw the block diagram of a typical robotic mechanical system. [3]
3B. Design a logic diagram of XNOR Gate with expression and truth table. [3]
3C. Wapp to print the table of any given number n.where n is taken by user input. [9]

4A. Working principles of Computational block of a robot. [3]
4B. With the help of diagram show that step by step process of converting high level language to machine level language. [3]
4C. Wapp to check whether a number is an Armstrong number or not. [9]

5A. Working of a robot algorithm. [3]
5B. Design a logic circuit diagram to implement AND Gate using NOR gate. [3]
5C. Write a Python program that takes a student's score as input and prints the corresponding grade based on the following grading system: [9]

- A+ if the score is between 90 and 100.
- A if the score is between 80 and 89.
- B if the score is between 70 and 79.
- C if the score is between 60 and 69.
- D if the score is between 50 and 59.
- E if the score is between 40 and 49.
- F if the score is below 40.

6A. Explain humanoid Robot and its general identification rules. [3]
6B. Design a logic circuit diagram to implement OR Gate using NAND gate. [3]
6C. Wapp to print Fibonacci series upto n number.where n is taken by user input. [9]

7A. Explain mobile Robot and its general identification rules. [3]
7B. Explain the Turing Test. It's uses and importance. [3]
7C. Write a Python program that calculates the sum of digits in a number [9]

8A What are Underwater Robots? Design aspects of Underwater Robots. [3]
8B. What is Artificial intelligence? Explain any three Advantages and Disadvantages of AI. [3]
8C. Write a python program to print the following patterns. [9]

```
$***$
*$ $*
* $ *
*$ $*
$***$
```

```
0
1 2
3 4 5
6 7 8 9
```

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